

Contributors to This Issue

J. F. BAMPTON, B.Sc. in Engineering 1941; British Post Office Engineering Department 1936. Mr. Bampton progressed by competitive examinations to a professional grade in 1942, and in 1944 he was loaned for two years to the government of India to assist with the rapid expansion of carrier telephone and telegraph systems. Since then he has been associated with most of the submerged repeater transmission systems around the British Isles, taking charge of a group in the Transmission and Main Lines Branch of the Engineering Department in 1950. From 1953 to 1956 he was concerned entirely with the transatlantic submarine telephone cable system. Associate Member of The Institution of Electrical Engineers.

M. C. BISKEBORN, B.S. in E.E., S. Dak. School of Mines, 1930; Bell Telephone Laboratories, 1930-42. Western Electric Company, 1942-44; Bell Telephone Laboratories, 1944-. His early work at the Laboratories was concerned with the development of multi-pair carrier and coaxial cables. During World War II, he assisted in the development of one of the first automatic radars, of microwave resonant cavities and of microwave coaxial for the Bureau of Ships. Later, Mr. Biskeborn worked on the development of apparatus for high-frequency electrical measurements on cable. He holds several patents and has written several technical papers including an A.I.E.E. prize paper. At present, he heads a subdepartment on Cable Development. As a part of these responsibilities he was concerned with the design of the transatlantic telephone cable and was responsible for the specifications for it. He is an Associate Member of the A.I.E.E.

F. J. BRAGA, B.E.E., Univ. of Minnesota, 1930; Illinois Bell Telephone Company, 1930-33; Bell Telephone Laboratories, 1934-. Mr. Braga has engaged in development of transmission networks for carrier systems. During World War II he worked on gun computers and networks and circuits for radar applications. He is currently engaged in the development of networks for undersea systems. He is a member of I.R.E.

R. A. BROCKBANK, B.Sc. in Engineering, London University 1922; Ph.D. London University 1934. Dr. Brockbank joined the Research Branch of the British Post Office in 1933 after 10 years in industry, including dielectric research on the original transatlantic cable proposed in 1928. He designed the repeater equipment for the first coaxial cable system in England, 1938. During the war, he was engaged in coaxial developments and on high power negative feedback wideband transmitters. Following the war, he was associated with television transmission over coaxial systems and with submerged repeater development. In 1949 he specialized in this latter work, and since 1953 has been in charge of research and development of submerged repeater systems.

J. W. EMLING, B.S. in E.E., Univ. of Pennsylvania, 1925; Development and Research Department of American Telephone and Telegraph Co., 1925-34; Bell Telephone Laboratories, 1934-. While at A. T. & T. Mr. Emling was particularly concerned with transmission standards and with developing a system of effective transmission rating. He continued this work at Bell Laboratories. In World War II he was concerned with studies in the field of underwater acoustics. Subsequently he has been concerned with systems engineering studies in the fields of engineering economy, voice frequency transmission, rural carrier, radio and television. One of his recent responsibilities covered the early transmission and planning studies of the transatlantic telephone cable system. He is currently Director of Transmission Engineering with responsibility for the systems engineering aspects of exchange and long distance transmission, carrier transmission over wire, telephone stations and some forms of digital transmission. He is a member of the Acoustical Society of America, A.I.E.E., Eta Kappa Nu and Tau Beta Pi.

H. B. FISCHER, B.S. in E.E., Univ. of Wisconsin, 1924; Western Electric Company, 1924-25; Bell Telephone Laboratories, 1925-. Mr. Fischer first worked on broadcast receivers, but after the development of aircraft communication apparatus was started he engaged in the design of aviation receivers. This was followed by work on various types of aviation communication equipment, mobile radio equipment for Bell System use and radio receiving equipment for aircraft instrument landing systems. During the war he worked on various types of electronic equipment for the Armed Forces. Later he worked on overseas radio telephone equipment, video transmission and testing equipment, and submarine communications systems. More recently he has worked on the transatlantic telephone cable project in connection with the manufacture of cable in England.

JOHN M. FRASER, B.E.E., Polytechnic Institute of Brooklyn, 1945; Bell Telephone Laboratories, 1934-. Prior to World War II, Mr. Fraser was concerned with the evaluation of subjective factors affecting the transmission performance of telephone systems. This included the design of equipment for simulating transmission systems in the laboratory. During the war he was chiefly concerned with the design and evaluation of communication systems for the military. Later he was engaged in transmission work on long distance carrier systems. On the transatlantic telephone cable he was mainly concerned with the System Engineering aspects of the cable system. He is a member of Sigma Xi, Tau Beta Pi and Eta Kappa Nu.

T. F. GLEICHMANN, B.E., Johns Hopkins Univ., 1929; Bell Telephone Laboratories, 1929-. Until 1942 Mr. Gleichmann was engaged in the design and development of open wire and cable carrier systems. During the period of World War II he worked on the design and development of radio telephone pulse communication systems for military and Bell System applications. He then engaged in development work in connection with coaxial cable carrier systems. He was in charge of the group responsible for the circuit and mechanical design of the repeater unit for the transatlantic submarine telephone cable. He is a member of Tau Beta Pi.

R. G. GRIFFITH, graduate I.E.E., London 1924. Studied general engineering in Royal Naval Air Service and Communication Engineering in London. Mr. Griffith left England in 1924 to join All-American Cables Inc. (now American Radio and Cable Corporation) becoming Project Engineer in 1925, supervising ac telegraph transmission superimposed tests (then termed "wired wireless") on dc duplex telegraph cable between Balboa Canal zone and Fishermans Point, Cuha. He developed and supervised the introduction of the synchronous fork cable signal regenerator, which established the through cable circuits between New York and Buenos Aires via the west coast cables of South America. In 1929 Mr. Griffith was appointed Assistant Chief Engineer of Creed and Company, and in 1932 was placed in charge of development. In 1935 he joined Cable and Wireless Limited. From 1943 to 1946 he was loaned to the foreign office communication center in charge of special machine cipher development. He became Chief Engineer of Cable and Wireless London Communications center in 1946, and in May 1954 joined the Canadian Overseas Telecommunication Corporation as Chief Engineer. Mr. Griffith holds some 60 patents relating to telecommunications.

R. J. HALSEY, B.Sc. in Engineering, London University, City and Guilds College, 1926; Diploma of the Imperial College, 1926. Mr. Halsey entered the Engineering Research Branch of the British Post Office in 1927 where he was engaged on line transmission problems including, from 1938, the design of submerged repeaters and systems. In 1947 he became Head of the Line Transmission Division, and in 1952, Assistant Engineer-in-Chief concerned with all submarine cable matters; in this capacity, his primary concern has been the transatlantic submarine telephone cable. Associate of the City and Guilds of London Institute and Member of the Institution of Electrical Engineers.

WILLIAM W. HEFFNER, B.S. in Industrial Engineering, Pennsylvania State University 1929; Western Electric Company, Kearny, New Jersey, 1929-1932; Consulting work on industrial engineering in the Management Field 1932-1936; Western Electric Company 1936-. Mr. Heffner's initial work at Western was concerned with jacks, keys, and mica capacitors. In 1942, he became a Department Chief in charge of manual telephone apparatus. In 1947 he was made an Assistant Superintendent in engineering for manual apparatus. His assignments continued through 1952 in engineering for several manufacturing engineering functions, including factory engineering, manufacture of manual apparatus and equipment, metal finishing, material handling, and packing. Between 1952 and 1954 he was Assistant Superintendent in charge of the Relay Assembly Shops at Kearny, New Jersey. In 1954 he was placed in charge of operating, production control, plant operations, and maintenance at Hillside, New Jersey, where the flexible repeaters for the transatlantic submarine telephone cable were manufactured. More recently, he was placed in charge of the Fairlawn, New Jersey, shop of Western Electric, where telephone apparatus and switching equipment are being built. Mr. Heffner is a member of Sigma Tau.

M. F. HOLMES, B.Sc. in Physics 1937; British Post Office 1938-. Mr. Holmes transferred to the Engineering Department in 1942 and since 1944 has been concerned primarily with thermionics. He is now engaged in the study of factors leading to changes of tube characteristics.

JOHN S. JACK, Mountain States Telephone and Telegraph Company 1919-1930; American Telephone and Telegraph Company, Long Lines Department, 1930-. Mr. Jack was engaged in various Plant assignments in Colorado and Wyoming between 1919 and 1930. In 1930, he became Division Outside Plant Engineer for Long Lines in Denver; in 1938 he

transferred to Chicago as Division Plant Engineer, and three years later, moved to Omaha, Nebraska as District Plant Superintendent. He was transferred to the Personnel Department in New York in 1945 as General Supervisor of Wages and Working Practices. In 1949 he returned to the Plant Department as General Construction Supervisor, and in 1951 became Engineer of Outside Plant. In 1953 he was appointed Assistant General Manager—Special Projects; in this capacity he helped direct construction of the transatlantic submarine telephone cable. Mr. Jack is a licensed professional engineer in Nebraska.

M. J. KELLY, B.S., Missouri School of Mines and Metallurgy, 1914; M.S., Univ. of Kentucky, 1915; Ph.D., Univ. of Chicago, 1918; honorary degrees — D.Eng., Univ. of Missouri, 1936; D.Sc. Univ. of Kentucky, 1946; LL.D., Univ. of Pennsylvania, 1954; D.Eng., New York Univ., 1955; D.Eng., Polytechnic Institute of Brooklyn, 1955. Western Electric Company, 1918–25. Bell Telephone Laboratories, 1925—. Dr. Kelly became Director of Vacuum Tube Development in 1928; Development Director of Transmission Instruments and Electronics, 1934; Director of Research, 1936; Executive Vice President, 1944; President, 1951. He was awarded the Presidential Certificate of Merit in recognition of his contributions in World War II and now serves on several advisory boards in the Department of Defense and the Department of Commerce. Dr. Kelly is a Fellow of the American Physical Society, the Acoustical Society of America, I.R.E., and A.I.E.E. He is a Foreign Member of the Swedish Royal Academy of Sciences and a member of the National Academy of Sciences, the American Philosophical Society, Sigma Xi, Tau Beta Pi and Eta Kappa Nu. He is a Life Member of the M.I.T. Corporation and a Trustee of Stevens Institute of Technology. His honors include the Air Force Association Trophy in 1953; the Industrial Research Institute Medal in 1954; and the Christopher Columbus International Communication Prize in 1955.

R. KELLY, Associate of Royal College of Science, Ireland 1925; B.Sc. University College, Dublin 1937. After four years experience on power work for the Dublin United Tramways, he joined the power section of Standard Telephones and Cables in 1925. Following ten years of laboratory and field experience on carrier telephone and VF telegraph equipment, he took charge in 1936 of power development for transmission equipments.

HAROLD A. LAMB joined the Western Electric Company Installation Department in 1920, where he became engaged in installation and

installation engineering of telephone equipment. In 1923, he entered the Engineer of Manufacture Organization at Hawthorne, where he became concerned with relays, panel, step-by-step, and crossbar machine switching apparatus. During this time, he attended the Lewis Institute of Technology. In 1936 he was appointed a Department Chief on step-by-step apparatus. During World War II, Mr. Lamb transferred to the Passaic, New Jersey, Shops as Assistant Superintendent in the Western Electric Radio Division. Here he was engaged in engineering the manufacture of submarine radar and radar bomb sights. Returning to the Western Electric, Kearny, New Jersey, Works in 1947, he was concerned principally with central office apparatus, including the card translator, and in 1953 was placed in charge of the Hillside, New Jersey, Engineering and Inspection Organizations for building the flexible repeaters for the transatlantic submarine telephone cable. He is at present Resident Head of the Hillside Shops on flexible repeater manufacture.

ANDREW W. LEBERT, B.S. in E.E., New York Univ., 1932; Cornell-Dubilier Corporation, 1932-1936; Bell Telephone Laboratories, 1936-. For the first five years at the Laboratories, Mr. Lebert worked on transmission engineering on open wire and cable carrier systems. He then was concerned with fault location problems. During World War II, he turned to military communications on cable and open wire, and, following this period, he spent eight years on coaxial cable systems development. Since 1952 he has been connected with transatlantic telephone cable development. He is a member of I.R.E., Tau Beta Pi and Psi Upsilon.

CAPT. W. H. LEECH entered the British Post Office in 1920 as Third Officer of H.M.T.S. *Alert* and was later promoted to the old H.M.T.S. *Monarch* of which ship he became Chief Officer. Both of these ships were subsequently lost by enemy action in World War II. After a year ashore as Assistant Submarine Superintendent in 1938-39 he took command of H.M.T.S. *Aeriel* and, in 1940, of H.M.T.S. *Iris*. In 1944 his ship was engaged in laying cables to the Normandy Beach head, an operation for which he was awarded the Distinguished Service Cross. In 1946 he became Submarine Superintendent, in immediate charge of the Post Office cable fleet and as such, directed the operations of H.M.T.S. *Monarch* during the laying of the transatlantic cables. He is an Officer of the Order of the British Empire (O.B.E.).

HERBERT A. LEWIS, E.E., Cornell Univ., 1926; Bell Telephone Laboratories, 1926-. Before World War II Mr. Lewis worked on the design

of equipment for manual and dial central offices, PBX's and broad-band carrier installations. During the war, he was concerned with the mechanical design of radar systems for the military. He was later responsible for transmission and equipment development for various carrier telephone systems. As project engineer for the Laboratories phases of the transatlantic telephone cable he was responsible for its transmission and equipment development. He is now Director of Outside Plant Development and is responsible for the devising and developing of new and improved methods, materials and equipment for that part of the telephone network which connects one central office with another and which ties the telephone customer's equipment into the central office. He is a senior member of I.R.E.

ARTHUR H. LINCE, B.S. in E.E., Univ. of Michigan, 1925; Bell Telephone Laboratories, 1925-. Until 1941 Mr. Lince worked on the engineering and design of dial central office equipment. During World War II he was concerned with engineering and design of radar for the armed forces. He then became involved with the development of microwave antennas, towers, waveguides and related items for microwave radio relay systems and testing equipment. He was engaged in the building of repeaters for the Havana-Key West submarine cable. Beginning in 1953, he has been in charge of the group responsible for the design of watertight enclosures for the repeaters used on the transatlantic telephone cable.

G. H. LOVELL, B.S. in E.E., Texas A & M College, 1927; M.S. in E.E., Polytechnic Institute of Brooklyn, 1943; N.Y. Edison Co., 1927-28; Bell Telephone Laboratories, 1929-. From 1929 until 1948 Mr. Lovell was concerned with the development of crystal filters for carrier systems. He then worked on the development of networks for use in broad-band amplifiers. For the transatlantic telephone cable project he worked on the amplifier networks and the equalization of the undersea system.

J. O. McNALLY, B.S. in E.E., Univ. of New Brunswick, Canada, 1924; Western Electric Company, 1924-25; Bell Telephone Laboratories, 1925-. Mr. McNally has specialized in research and development on electron tubes for Bell System communication and military uses. This included work on voice and carrier repeater tubes, electron tubes for the first commercial transatlantic radio system, and for the talking movie industry. During World War II, he had development responsibility for

many of the klystrons used in radar equipment. Later he again became concerned with the development of long-life tubes for submarine telephone cables. He has been awarded several patents on electron tube construction and operation. He is a Fellow of the I.R.E. and a member of the American Physical Society.

GEORGE W. MESZAROS, B.E.E. 1939, College of the City of New York; Bell Telephone Laboratories, 1926-. Mr. Meszaros started his Bell System career in the Systems Drafting Department. After spending a short time in several engineering groups of the System Department, he transferred to the Power Development Department in 1941. Here he has specialized in electronically controlled power equipment. Currently he is in charge of a group designing transistorized power supplies for the electronic switching system and for several military projects.

G. H. METSON, B.Sc. in Engineering, University of London 1931; M.Sc. in 1938 and Ph.D. in Applied Science and Technology, Queens University, Belfast 1941. Dr. Metson is in charge of the Thermionics Group at the Post Office Research Station and is particularly concerned with oxide coated cathodes and problems of tube life. He was responsible for the tubes used in the British submerged repeaters. Member of the Royal Institution and an Associate Member of The Institution of Electrical Engineers.

ELLIOTT T. MOTTRAM, B.S. Columbia University 1927, M.E. 1928; Western Electric Company 1922-25; Bell Telephone Laboratories, 1928-. Mr. Mottram's first assignments were in the development of disc recording and reproducing machines and equipment. Later he was concerned with sound on film recording and reproducing equipment, and with tape recording. From 1939 to 1950, he was engaged in development of airborne radio and radar equipment, electronic computer and bomb sights, and airborne homing missiles. As Director of Transmission Systems Development since 1950, he has been concerned with the development of transmission systems and equipment for military purposes, transmission test equipment, and television and wire transmission systems. In this capacity, he was responsible for technical liaison with the British Post Office on submarine cable matters and was in charge of Laboratories' activities in this field. He is a member of the A.S.M.E. and I.R.E.

SIR GORDON RADLEY, B.Sc. in Engineering, University of London 1919; Ph.D. University of London 1934. Sir Gordon's under-

graduate studies were interrupted by military service in World War I. Engineering Research Branch of the British Post Office 1920, where he was engaged initially on materials problems and later on interference, corrosion, and long distance signaling. He became Head of Research in 1939, and in 1949 was made Deputy Engineer-in-Chief. In 1951 he became Engineer-in-Chief, and in this position, was one of the principal architects of the transatlantic submarine telephone cable system. In 1954 he was made Deputy Director General, and in 1955 Director General — the permanent Head of the British Post Office. He became a Commander of the Order of the British Empire (CBE) in 1946 and was honored with a knighthood in 1954. In 1956, he became a Knight Commander of the Bath (KCB) and is President of The Institution of Electrical Engineers for the year 1956-57.

H. H. SPENCER, B.S. in M.E., Univ. of New Hampshire, 1923; Bell Telephone Laboratories, 1923-. He has been engaged primarily in the development of power supplies for broadband carrier, long distance and repeater equipment, including automatic plants for unattended operation on J, K, and L carrier systems and TD-2 microwave radio relay systems. Mr. Spencer is an Associate Member of the American Institute of Electrical Engineers.

J. F. P. THOMAS, B.Sc. London University 1942; British Post Office Research Branch, 1937-. In his early years, Mr. Thomas was engaged on investigations into contact phenomena and dust core magnetic materials. In 1948, he was transferred to the Submerged Repeater Group, where his main work has been the design and construction of power feeding equipment and pulse monitoring equipment used for fault location in submerged repeater systems. Associate Member of The Institution of Electrical Engineers.

REXFORD S. TUCKER, A.B., Harvard College, 1918; S.B., Harvard Engineering School, 1922; American Telephone and Telegraph Company, 1923-34; Bell Telephone Laboratories, 1934-. Mr. Tucker's early work was on noise and crosstalk prevention. During World War II he was engaged in classified military projects and served as co-editor of a War Department technical manual, *Electrical Communications Systems Engineering*. After the war he worked on mobile radio systems engineering and then the transatlantic telephone cable. He is an Associate Member of A.I.E.E., Senior Member of I.R.E., Charter Member of Acoustical Society of America, member of Sub-Committee No. 1 of

American Standards Association Sectional Committee C63, Harvard Engineering Society, and Phi Beta Kappa.

EDMUND A. VEAZIE, B.A. in Physics, Univ. of Oregon, 1927; Bell Telephone Laboratories, 1927-. His early assignments included the design of multi-grid tubes for use in aircraft radio receivers, police transmitters, and carrier telephone systems. During World War II he concentrated on tubes for radar and other military applications, including proximity fuses and gun directors. Since then he has been engaged principally in the design, fabrication control, testing, and selection of tubes for use in submarine telephone cable systems. He holds several patents on electron tubes and associated circuits. He is a Senior Member of I.R.E. and a member of Phi Beta Kappa.

D. C. WALKER, B.Sc. in Engineering and Diploma of the Imperial College from the City and Guilds College, University of London, 1937; British Post Office Research Branch 1938. Mr. Walker's early work was on interference and protection problems and during the war on special investigations for the services. Later engaged on development and equipment for carrier telephone systems, and since 1946 has specialized on submerged repeater systems. He is in charge of the group concerned with the design of the internal electrical unit of the rigid transatlantic telephone cable repeaters and the special terminal equipment. Associate Member of The Institution of Electrical Engineers.

V. G. WELSBY, B.Sc. London University 1934; Ph.D. London University 1946; Research Branch of the British Post Office, 1936. Dr. Welsby was at first a member of a group dealing with the design of multichannel carrier apparatus. Since 1947 he has been engaged in submerged repeater development, and during the last few years, has been in charge of the group concerned with the mechanical design of repeater housings and glands, and with the laying of rigid repeater systems. His Ph.D. degree was awarded for his work on dust-cored inductors. He is the author of a text book on inductor theory and design. Associate Member of The Institution of Electrical Engineers.

M. C. WOOLEY, B.S. in E.E., Ohio Northern Univ., 1929; Bell Telephone Laboratories, 1929-. Mr. Wooley was engaged in the development and design of inductors until 1935. Capacitor development then occupied his attention until 1949, concluding with the development and produc-

tion of capacitors for the Key West-Havana submarine cable repeaters. He then became concerned with fundamental development, primarily on materials and processes used in capacitors, including those for the transatlantic submarine telephone cable. He is currently supervising a group engaged in development and design of capacitors and resistors for submarine cable repeater applications for other systems. He is a member of Nu Theta Kappa.